Emergency Childbirth

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Under normal conditions, the arrival of a child can be a joyous occasion welcomed by all involved. The prehospital environment may not represent the ideal location for a delivery, but in most cases, it is still a happy event. This article will focus on the care of the obstetrical patient before, during and after childbirth, care of the newborn, and some abnormal delivery emergencies. This represents guidelines; as with any prehospital care, you must always follow your medical director's protocols.

Anatomy and Physiology Review

Each month, the female sex organs known as the ovaries release an egg into the fallopian tube. Conception normally takes place within one of the fallopian tubes when the egg and the sperm unite. Between the fourth and seventh day after being released, the fertilized egg has completed its journey through the tube and comes to rest on the upper back wall of the uterus.

The uterus is a hollow, pear-shaped muscular organ composed of three tissue layers. These layers help to provide nutrients during fetal development, contract during labor to expel the fetus, and close off blood vessels following delivery thus preventing the mother from hemorrhaging.

The elongated lower portion of the uterus is called the cervix and opens into the vagina. The vagina is a fibrous

muscular tube that extends to the outside of the body and is sometimes referred to as the birth canal. A mucus plug seals the cervix during pregnancy. As labor begins, cervical changes release the mucus plug, which is expelled from the vagina.

These female reproductive organs lie in close proximity to the bladder and bowel. As the pregnant uterus grows in size, it places pressure on these organs. Females in the later stages of pregnancy complain of frequent urination and the sensation of an impending bowel movement when birth is imminent.

Organs of Pregnancy

Attached to the internal uterine wall is a flattened organ called the placenta. The placenta provides support for the fetus during intrauterine development and originates from the same mass of cells from which the fetus develops. Respiratory gases, nutrients, wastes, antibodies, hormones and electrolytes are transferred between mother and child through the membranes within the placenta. The placenta is attached to the fetus by a long twisting collection of tubes known as the umbilical cord. Throughout the pregnancy, the umbilical cord grows to meet the needs of the fetus. At birth, there may be as many as 40 spiral twists present in the cord. A true knot is created when a fetus has moved through a loop of cord and is one of the causes of still birth.

The fetus is surrounded by a bag of water known as the amniotic sac. At term, the sac contains about 1,000 mL of fluid, most of which is water. The amniotic fluid serves as a cushion to decrease external forces applied to the fetus, especially in early pregnancy. Later in the pregnancy, some of the fluid comes from fetal urine.

Fetal Circulation

Maternal blood flow is essential for fetal development and well-being. However, the mother's blood does not flow directly through the infant. The baby has its own circulatory system. Blood from the fetus flows through the umbilical cord, filters through the fetal side of the placenta, and then returns to the infant. The separation of the maternal and the fetal blood supplies at the placenta is called the placental barrier. The placental barrier allows some substances, such as oxygen and glucose to pass from mother to baby, but prevents other substances, such as certain drugs, from diffusing across.

Progress of Gestation (the Trimesters of Pregnancy)

A full term pregnancy lasts approximately 280 days and can be divided into three-month intervals called trimesters.

During the first trimester, the uterus does not enlarge very much. The fetus is still very tiny, but in the first trimester, all essential fetal body parts form. During this time, the mother may experience breast tenderness due to the enlargement of breast tissue; fatigue because of frequent urination as the uterus expands enough to put pressure on the bladder; heartburn due to decreased gastric emptying; and nausea/vomiting or morning sickness thought to be caused by pregnancy hormones released from the placenta.

By the time the second trimester begins most of these symptoms will disappear. The second trimester is generally a period of well-being highlighted by the first sensation of fetal movement.

During the third trimester, the growing uterus causes the mother's diaphragm to elevate which leads to shortness of breath. An increase in the maternal blood volume will produce a physiological anemia. Leg cramps are common. The expanding abdomen changes the mother's center of gravity and predisposes her to falls.

Labor

The majority of pregnancies proceed normally with minimal risks. However, EMS personnel must be prepared to deal with any number of complications that may develop with little or no warning.

The presentation of labor may be classic or with variations and can be divided into three stages. During the first stage, regular uterine contractions cause the cervix to dilate. The cervix must be completely dilated before the baby can pass from the uterus into the birth canal. In first pregnancies, this stage can last for a very long period of time, hours in fact, but generally gets shorter with each successive pregnancy.

Sometimes, the patient thinks she is in labor when she is not. Some patients develop an irregular rhythmic uterine tightening known as Braxton Hicks contractions. In contrast to the contractions of true labor, Braxton Hicks contractions are frequently painless and made easier as the patient walks around.

During the first stage, the contractions get progressively more frequent and intense. An expulsion of the mucus plug occurs in a bloody show. The amniotic sac or bag of water frequently ruptures. It is important to determine the color of the amniotic fluid whenever possible. Normal fluid should be clear. If the water is thin with a slight greenish discoloration, meconium may be present. Meconium is fetal intestinal contents composed mostly of sloughed skin cells that have been swallowed by the baby. If the amniotic fluid is a thick pea-soup type of liquid, the meconium level is very high and represents a serious threat to the infant.

Stage two begins when the cervix is completely dilated and lasts until the birth of the baby. The average time the mother spends in stage two is about an hour and a-half with the first baby to about thirty minutes in successive pregnancies. During this stage, the contractions become stronger and last longer than previous contractions. The patient may complain of an urge to push or to have a bowel movement which usually means that delivery is imminent.

The third stage of labor begins when the baby is born and continues until the delivery of the placenta. This stage may last anywhere from 5 to 20 minutes.

Prehospital Care

Patients in uncomplicated labor usually require only supportive therapy. The ABCs should be maintained, supplemental oxygen may be applied to keep the patient well saturated, and an ECG can be attached. An IV can be established with normal saline and fluid may be administered to keep the patient's systolic blood pressure above 90 mm Hg.

Very early in the assessment, EMS personnel must determine whether delivery is imminent or if the mother can be safely transported to the hospital before childbirth. Imminent delivery may be evidenced by perineal or rectal bulging, uncontrollable

pushing, the sensation of an impending bowel movement, or visible crowning.

If the labor is premature or if the pregnancy or delivery is high-risk, such as breech presentations, multiple births, or meconium staining, initiate transport as soon as possible to a facility equipped for and capable of handling a complicated obstetrical emergency.

In uncomplicated labor when the birth is imminent, quickly prepare for delivery because little can be done to prevent the birth. If the baby is not born within ten minutes, begin transport and all subsequent care can be delivered on the way to the hospital.

EMS personnel must resist the urge to prevent or delay delivery. Do not hold the mother's legs together. Do not let the mother go to the bathroom. Recognize your own limitations and if necessary, begin transport.

Field Delivery

If delivery is imminent, place the mother on her back with her knees widely separated. The buttocks can be elevated with pillows to allow access to the perineal area. If time permits, a sterile field should be made around the vaginal opening with the sterile towels or paper barriers that are included in a prehospital OB kit.

Place the palm of one hand gently over the advancing head of the fetus to prevent an explosive delivery. Be careful not to press on the soft spot of the baby's head. If the amniotic sac has not ruptured, puncture the membrane being careful not to injure the child. Remove the membrane from the baby's face.

As the head emerges, the mother should be encouraged **not** to push so the delivery can continue slowly and with minimal trauma to the perineal area. Having the mother take slow deep breaths through her mouth will help her overcome the strong urge to push.

As soon as the baby's head emerges, suction the baby's mouth first and then the nasal passages in order to clear secretions. Suction should be performed before the shoulders and chest delivers.

If the umbilical cord is wrapped around the infant's neck, it can usually be slipped down over the infant's shoulder. If the cord is too tightly wrapped around the neck, clamp the cord in two places and cut between the clamps with sterile scissors or scalpel. Do not use trauma shears as this may introduce bacteria into the baby's blood stream.

One shoulder is then delivered with the next contraction. The upper shoulder usually passes first with gentle downward pressure on the head; the lower shoulder can then be delivered with gentle upward pressure on the head. You should never exert traction on the infant's head or neck in order to facilitate delivery.

Usually, once the shoulders are free, the rest of the infant's body delivers rapidly. Be prepared and hold the infant tightly.

Once delivered, support the infant at the level of the vagina. Wipe the blood and mucus from the baby's face with a clean towel or sterile gauze provided in the OB kit. Suction the baby's mouth and nose again to clear all fluids from the upper airway.

Place two umbilical clamps at 4 inches and 6 inches from the infant's abdomen. Using sterile scissors or a sterile scalpel cut the cord between the two clamps. Do not use trauma shears.

Examine the cut ends of the cord for bleeding; if the cut end attached to the infant is bleeding, apply an additional cord clamp and reassess for bleeding. Do not remove the first clamp.

Wrap the infant in a clean, dry, warm blanket and place the baby on its side to facilitate draining of the airway.

Meconium Suctioning

For deliveries complicated by the presence of meconium, some modifications to the delivery procedure must be made.

Following delivery of the head but before shoulder delivery, the newborn's mouth and nose (in that order) should be thoroughly suctioned. Suctioning before the chest delivers minimizes the chance that the infant will aspirate meconium below the vocal cords with his or her first breath.

After delivery of the infant, suction any residual meconium from the mouth and nose. Do not stimulate the baby before suctioning to prevent the baby from inhaling any meconium with its first breath.

If the infant is depressed or if the meconium is thick or particulate, perform direct endotracheal suctioning using an ET tube as a suction catheter or one fitted with a meconium aspirator. Quickly intubate the trachea, preferably before the infant takes his or her first breath. Apply suction to the proximal end of the ET tube while withdrawing it. During this procedure, aim 100 percent oxygen toward the infant's face and monitor the heart rate. If the infant heart rate falls below 60 beats per minute, ventilate with a pediatric BVM. Repeat the intubation-suction-extubation cycle until no further meconium is obtained. Do not ventilate between cycles unless the heart rate drops below 60. If the ET tube occludes with meconium, replace it with a fresh tube.

After tracheal suctioning is complete, continue resuscitation as needed.

Neonatal Care

Once the baby is delivered, there are three basic steps that must be taken to prevent the deterioration of the infant.

Clear the Neonatal Airway

Place the neonate on its back or side. Insure the infant's neck is in a neutral position. If you flex or extend the neck too far, the airway can become compromised. You can place a small folded towel under the infant's shoulders to help keep the neck neutral.

Suction the mouth and nose with a bulb syringe for no more than 5 seconds at a time. Avoid deep or vigorous suctioning which can make the baby stop breathing or slow the heart rate significantly. Monitor the infant's heart rate during suctioning. If the heart rate slows below 100 beats per minute, stop suctioning and begin blow-by oxygen.

Prevent Neonatal Heat Loss

Newborns are very susceptible to heat loss. Remember, they have just

spent the last 40 weeks in a very warm incubator and are now wet from head to toe. Dry the infant's head and body. If the baby was born before your arrival, remove any coverings that might be wet.

Cover the infant with dry wrappings making sure to cover the head. If the mother and infant are both stable, you can place the naked infant against the mother's body, and cover both the mother and infant. The mother's body heat will help to keep the baby warm.

Provide Neonatal Stimulation

In most cases, drying and suctioning alone will induce respirations. If not, provide tactile stimulation for 5 to 10 seconds by flicking the soles of the infant's feet or rubbing the infant's back. If respirations are inadequate or do not begin, provide blow-by oxygen or positive pressure ventilation with a bag-valve mask at a rate of 60 breaths per minute.

Oxygen administration is not usually necessary for normal newborns with cyanosis in the extremities, a condition common during the first few minutes of life. If however, the baby is cyanotic in the extremities and in the body core, blow-by oxygen should be administered. If this fails to correct the hypoxia, begin assisting ventilations.

APGAR Scoring

At the 1-minute and 5-minute marks after the baby is born, you should give the baby an APGAR score. APGAR scoring was created by Dr. Virginia Apgar in the 1920s to serve as a consistent method of assessing neonatal viability.

Appearance

Assess the appearance of the baby. If the entire body is pink, the baby gets 2 points. If the trunk is pink but the hands or feet are blue, this is called acrocyanosis and the score is 1. If the entire baby is blue or pale, the baby receives no points for appearance.

Pulse

Listen to the baby's apical heart rate and feel a brachial pulse for at least 30 seconds. If the heart rate is greater than 100, award 2 points. If the heart rate is less than 100, begin assisting ventilations and score 1 point. If no pulse is present, begin CPR and score no points.

Grimace

This measures the baby's response to a stimulus and can be tested by snapping a finger against the soles of the feet or gently inserting the bulb syringe into the baby's nostril. If the infant cries and pulls the foot away or sneezes, the score is 2. If there is only a weak reaction or grimace, the score is 1. No reaction scores 0.

Activity

The degree of muscle tone or activity indicates the degree of tissue oxygenation. Normally, the hips and knees are flexed and the baby will resist attempts to straighten them out. This is worth 2 points. If the baby only

weakly resists attempts to straighten the knees, the score is 1. If the child is flaccid or limp with no muscle tone, they receive no points.

Respiratory Effort

The child would get 2 points if the respirations are regular and rapid with a good strong cry. If the respirations are labored, weak, slow or gasping, assist ventilation and score 1 point. If respirations are absent, score nothing and resuscitate immediately.

APGAR Score

The highest APGAR score a newborn could achieve is 10; the lowest is a zero. APGAR scores should be used as a guide for trending improvements or deterioration in the neonate's status. If the initial APGAR score is 7 points or greater, the baby is active and stable needing only routine care. If the initial score is between 4 and 6 points, the infant is moderately depressed and needs warming, stimulation, suction, oxygen and possibly even ventilatory assistance. If the initial score is 3 points or lower, the baby is severely depressed and needs aggressive neonatal resuscitation, including CPR and rapid transport.

Maternal Postpartum Care

Even though there is a great deal of attention being paid to the newborn, you must not forget that you now have two patients that need care. Fortunately, the care of the mother following childbirth is usually simple and without serious complications.

Assess and support the mother's ABCs. Oxygen is not usually necessary, but must be provided if the bleeding is severe or evidence of shock is present. Begin transport of the mother and baby to the hospital as soon as possible.

It may take some time for the placenta to deliver. Do not pull on the umbilical cord in an attempt to recover the placenta. This may cause additional bleeding or in rare cases, it may cause the uterus to invert. Allow the placenta to deliver spontaneously. If the placenta delivers before you get to the hospital, collect and transport it with the patient for examination at the hospital.

Women can usually tolerate a blood loss of up to 500 mL after childbirth. If the loss exceeds that amount or the mother continues to bleed heavily after delivery, treat her for shock. Place the mother in the shock position, administer high-flow oxygen, keep the patient warm and begin fluid replacement with normal saline. If the perineum was torn during delivery, control external hemorrhage using gauze pads and firm pressure. It may be possible to slow internal bleeding by massaging the uterus. Do not attempt vaginal examination or vaginal packing to control bleeding.

Summary

The ideal place to have a baby is not in the back of an ambulance. However, the baby is usually unaware of his surrounding when he decides to make his entrance into the world. The vast majority of deliveries proceed normally. There will, on occasion, be complications. By frequently reviewing the childbirth procedure and practicing the technique on a manikin, EMS personnel may be able to prevent a happy event from becoming a disaster.

References

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